AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (currently amended): A digital audio signal encoding method comprising:

(a) performing a time-frequency transformation on an input audio signal and generating a time-frequency band table by dividing the transformed input audio signal into a plurality of frequency blocks in each frame and a time-frequency index combination;

(b) based on the generated time-frequency band table, searching for a nearest neighbor block of a current block being currently encoded, and generating information on the nearest neighbor block; and

(c) generating a bitstream containing the generated information on the nearest neighbor block,

wherein time-frequency band table includes a plurality of time frames, which have a time correlation, arranged to intersect with a plurality of frequency bands, which range from a lowest frequency band to a highest frequency band, to form the plurality of frequency blocks such that each frequency block corresponds to one of the plurality of time frames and one of the plurality of frequency bands, and

each frequency block is assigned index information including a time frame index and a frequency band index, the index information of a corresponding frequency block being dependent upon a location of the corresponding frequency block within the time-frequency table relative to a location and the index information of the current block.

2. (currently amended): The method of claim 1, wherein ~~in~~ step (b) includes determining whether the frequency of ~~a~~ the current block being currently encoded is equal to or greater than a threshold frequency corresponding to a high frequency band, and the bitstream generated in step (c) includes block information on a current block when the current block is included in a frequency band lower than the threshold frequency and nearest neighbor block information of a nearest neighbor block when the current block is included in a frequency band equal to or higher than the threshold frequency.

3. (original): The method of claim 1, wherein the nearest neighbor block information is index information of the nearest neighbor block, which is searched for, in the time-frequency band table.

4. (currently amended): The method of claim 1, wherein in step (b) a search scope of the nearest neighbor block includes blocks previous to the current block being currently encoded.

5. (original): The method of claim 1, wherein in step (b) determination of the nearest neighbor block is based on the Euclidian distance between the current block and an object block.

6. (original): The method of claim 1, wherein the nearest neighbor block information includes scale factor information.

7. (currently amended): A digital audio signal encoding method comprising:

(a) performing a time-frequency transformation on an input audio signal and generating a time-frequency band table by dividing the transformed input audio signal into a plurality of frequency blocks in each frame and a time-frequency index combination;

(b) based on the generated time-frequency band table, searching for a nearest neighbor block of a block being currently encoded;

(c) based on the nearest neighbor block searched for, determining whether or not a current block being currently encoded is a redundant block; and

(d) based on the result determined in step (c), generating an output bitstream,

wherein time-frequency band table includes a plurality of time frames, which have a time correlation, arranged to intersect with a plurality of frequency bands, which range from a lowest frequency band to a highest frequency band, to form the plurality of frequency blocks such that each frequency block corresponds to one of the plurality of time frames and one of the plurality of frequency bands, and

each frequency block is assigned index information including a time frame index and a frequency band index, the index information of a corresponding frequency block being dependent upon a location of the corresponding frequency block within the time-frequency table relative to a location and the index information of the current block.

8. (currently amended): The method of claim 7, wherein if it is determined in step (c) that the current block being currently encoded is the redundant block, the bitstream generated in step (c) includes nearest neighbor block information on the nearest neighbor block searched for in step (b), instead of current block information.

9. (original): The method of claim 8, wherein the nearest neighbor block information is index information of the nearest neighbor block, which is searched for in the time-frequency band table.

10. (currently amended): The method of claim 7, wherein if it is determined in step (c) that the current block being currently encoded is not the redundant block, the bitstream generated in step (d) includes current block information.

11. (currently amended): The method of claim 7, wherein in step (b) a search scope of the nearest neighbor block includes blocks previous to the current block being currently encoded.

12. (original): The method of claim 7, wherein in step (b) determination of the nearest neighbor block is based on the Euclidian distance between the current block and an object block.

13. (original): The method of claim 7, wherein the nearest neighbor block information includes scale factor information.

14. (currently amended): A digital audio signal encoding apparatus comprising:

a time-frequency band table generation unit which generates a time-frequency band table by dividing an input audio signal, on which time-frequency transformation is performed, into a plurality of frequency blocks in each frame and a time-frequency index combination;

a nearest neighbor block searching and nearest neighbor block information generation unit which, based on the generated time-frequency band table, searches for a nearest neighbor block of a current block being currently encoded, and generates information on the nearest neighbor block; and

a bitstream packing unit which generates a bitstream containing the generated information on the nearest neighbor block,

wherein time-frequency band table includes a plurality of time frames, which have a time correlation, arranged to intersect with a plurality of frequency bands, which range from a lowest frequency band to a highest frequency band, to form the plurality of frequency blocks such that each frequency block corresponds to one of the plurality of time frames and one of the plurality of frequency bands, and

each frequency block is assigned index information including a time frame index and a frequency band index, the index information of a corresponding frequency block being

dependent upon a location of the corresponding frequency block within the time-frequency table relative to a location and the index information of the current block.

15. (currently amended): The apparatus of claim 14, wherein the nearest neighbor block searching and nearest neighbor block information generation unit determines whether the frequency of the current block being currently encoded is equal to or greater than a threshold frequency, ~~and~~ the bitstream packing unit generates a bitstream including block information on ~~a~~ the current block when the current block is included in a frequency band lower than the threshold frequency and nearest neighbor block information of a nearest neighbor block when the current block is included in a frequency band equal to or higher than the threshold frequency.

16. (original): The apparatus of claim 14, wherein the nearest neighbor block information is index information of the nearest neighbor block, which is searched for in the time-frequency band table.

17. (currently amended): A digital audio signal encoding apparatus comprising:

a time-frequency band table generation unit which generates a time-frequency band table by dividing an input audio signal, on which time-frequency transformation is performed, into a plurality of frequency blocks in each frame and a time-frequency index combination;

a nearest neighbor block searching unit which, based on the generated time-frequency band table, searches for a nearest neighbor block of a current block being currently encoded;

a redundant block decision unit which, based on the nearest neighbor block, determines whether or not the block being currently encoded is a redundant block; and

a bitstream generation unit which, based on the result determined in the redundant block decision unit, generates an output bitstream,

wherein time-frequency band table includes a plurality of time frames, which have a time correlation, arranged to intersect with a plurality of frequency bands, which range from a lowest frequency band to a highest frequency band, to form the plurality of frequency blocks such that each frequency block corresponds to one of the plurality of time frames and one of the plurality of frequency bands, and

each frequency block is assigned index information including a time frame index and a frequency band index, the index information of a corresponding frequency block being dependent upon a location of the corresponding frequency block within the time-frequency table relative to a location and the index information of the current block.

18. (currently amended): The apparatus of claim 17, wherein, if the redundant block decision unit determines that the current block being currently encoded is the redundant block, the bitstream generation unit includes information on the nearest neighbor block which is searched for in the nearest neighbor block searching unit, in the output bitstream instead of current block information.

19. (currently amended): The apparatus of claim 17, wherein if the redundant decision unit determines that the current block being currently encoded is not the redundant block, the bitstream generation unit includes the current block information in the output bitstream.

20. (original): The apparatus of claim 18, wherein the nearest neighbor block information is index information of the nearest neighbor block, which is searched for in the time-frequency band table.

21. (currently amended): A decoding method for decoding an audio signal containing additional information on a predetermined region of the audio signal, comprising:

(a) decoding a block which is not included in the predetermined region, from an input audio bitstream;

(b) performing a time-frequency transformation on the decoded block data and generating a time-frequency band table by dividing the transformed decoded block data into a plurality of frequency blocks in each frame and a time-frequency index combination; and

(c) by using the generated time-frequency band table, reconstructing a current block included in the predetermined region, based on the additional information on the predetermined region of the audio signal.

wherein time-frequency band table includes a plurality of time frames, which have a time correlation, arranged to intersect with a plurality of frequency bands, which range from a lowest frequency band to a highest frequency band, to form the plurality of frequency blocks such that each frequency block corresponds to one of the plurality of time frames and one of the plurality of frequency bands, and

each frequency block is assigned index information including a time frame index and a frequency band index, the index information of a corresponding frequency block being dependent upon a location of the corresponding frequency block within the time-frequency table relative to a location and the index information of the current block.

22. (original): The method of claim 21, wherein the additional information includes index information on a nearest neighbor block of a current block in the predetermined region.

23. (original): The method of claim 21, wherein the predetermined region is a high frequency region.

24. (original): The method of claim 21, wherein the time-frequency band table generated in step (b) is updated by the current block reconstructed in step (c).

25. (original): The method of claim 21, wherein the additional information includes scale factor information.

26. (currently amended): A decoding method for decoding a digital audio signal comprising:

(a) extracting nearest neighbor block information from an input audio bitstream;

(b) performing a time-frequency transformation on the input audio bitstream and generating a time-frequency band table by dividing the transformed input audio bitstream into a plurality of frequency blocks in each frame and a time-frequency index combination;

(c) based on the extracted nearest neighbor block information, determining whether or not a current block being currently decoded is a redundant block; and

(d) if the block being currently decoded is the redundant block, by using the generated time-frequency band table, reconstructing the redundant block based on the extracted nearest neighbor block information,

wherein time-frequency band table includes a plurality of time frames, which have a time correlation, arranged to intersect with a plurality of frequency bands, which range from a lowest frequency band to a highest frequency band, to form the plurality of frequency blocks such that each frequency block corresponds to one of the plurality of time frames and one of the plurality of frequency bands, and

each frequency block is assigned index information including a time frame index and a frequency band index, the index information of a corresponding frequency block being

dependent upon a location of the corresponding frequency block within the time-frequency table relative to a location and the index information of the current block.

27. (original): The method of claim 26, further comprising reconstructing an entire spectrum corresponding to the input audio bitstream by using the reconstructed redundant block.

28. (original): The method of claim 27, wherein step (c) further comprises:

updating the time-frequency band table based on the reconstructed redundant block.

29. (original): The method of claim 27, wherein the nearest neighbor block information includes scale factor information.

30. (currently amended): A decoding apparatus for decoding an audio signal containing additional information on a predetermined region of the audio signal, comprising:

a decoding unit which decodes a block which is not included in the predetermined region, from an input audio bitstream; and

a post-processing unit which, performs a time-frequency transformation on the decoded block data and generates a time-frequency band table by dividing the transformed decoded block data into a plurality of frequency blocks in each frame and a time-frequency index combination,

and by using the generated time-frequency band table, reconstructs a current block included in the predetermined region, based on the additional information on the predetermined region of the audio signal,

wherein time-frequency band table includes a plurality of time frames, which have a time correlation, arranged to intersect with a plurality of frequency bands, which range from a lowest frequency band to a highest frequency band, to form the plurality of frequency blocks such that each frequency block corresponds to one of the plurality of time frames and one of the plurality of frequency bands, and

each frequency block is assigned index information including a time frame index and a frequency band index, the index information of a corresponding frequency block being dependent upon a location of the corresponding frequency block within the time-frequency table relative to a location and the index information of the current block.

31. (original): The apparatus of claim 30, wherein the additional information includes index information on a nearest neighbor block of a current block in the predetermined region.

32. (original): The apparatus of claim 30, wherein the predetermined region is a high frequency region.

33. (original): The apparatus of claim 30, wherein the generated time-frequency band table is updated by a reconstructed current block.

34. (currently amended): A decoding apparatus for decoding a digital audio signal comprising:

a nearest neighbor block information extracting unit which extracts nearest neighbor block information from an input audio bitstream;

a time-frequency band table generation unit which, performs a time-frequency transformation on the input audio bitstream and generates a time-frequency band table by dividing the transformed input audio bitstream into a plurality of frequency blocks in each frame and a time-frequency index combination; and

a redundant block reconstruction unit which, based on the extracted nearest neighbor block information, determines whether or not a block being currently decoded is a redundant block, and if the block being currently decoded is the redundant block, by using the generated time-frequency band table, the redundant block reconstruction unit reconstructs the redundant block based on the extracted nearest neighbor block information,

wherein time-frequency band table includes a plurality of time frames, which have a time correlation, arranged to intersect with a plurality of frequency bands, which range from a lowest frequency band to a highest frequency band, to form the plurality of frequency blocks such that each frequency block corresponds to one of the plurality of time frames and one of the plurality of frequency bands, and

each frequency block is assigned index information including a time frame index and a frequency band index, the index information of a corresponding frequency block being dependent upon a location of the corresponding frequency block within the time-frequency table relative to a location and the index information of the current block.

35. (original): The apparatus of claim 34, wherein the redundant block reconstruction unit reconstructs an entire spectrum corresponding to the input audio bitstream by using the reconstructed redundant block.

36. (original): The apparatus of claim 35, wherein the time-frequency band table generation unit updates the time-frequency band table based on the reconstructed redundant block.

37. (new): The method of claim 1, wherein each of the plurality of frequency bands has a plurality of spectrum coefficients.

38. (new): The method of claim 1, wherein the time-frequency table includes data of a scalar type.

39. (new): The method of claim 2, wherein the block information is the index information of the current block and the nearest neighbor block information is the index information of the nearest neighbor block.

40. (new): The method of claim 2, wherein only a portion of the audio signal corresponding to frequency bands less than the threshold frequency corresponding to the high frequency band is encoded and included in the bitstream generated to be output.

41. (new): The method of claim 4, wherein the blocks previous to the current block include previous blocks of lower frequency bands in a current frame which the current block is located and blocks of a predetermined number of previous frames.

42. (new): The method of claim 41, wherein the nearest neighbor block is a previous block which is searched for in the time-frequency band table and is the least different from the current block.

43. (new): The method of claim 5, wherein the nearest neighbor block is the object block which has a least Euclidian distance among blocks previous to the current block, including previous blocks of lower frequency bands in a current frame which the current block is located and blocks of a predetermined number of previous frames.

44. (new): The method of claim 43, wherein the nearest neighbor block is a previous block which is the least different from the current block.

45. (new): The method of claim 43, wherein only a portion of the audio signal corresponding to frequency bands less than a threshold frequency corresponding to a high frequency band is encoded and included in the bitstream generated to be output.

46. (new): The method of claim 1, wherein step (b) includes determining whether the frequency of the current block being currently encoded is equal to or greater than a threshold frequency corresponding to a high frequency band, and the bitstream generated in step (c) includes block information on a current block when the current block is included in a frequency band lower than the threshold frequency and nearest neighbor block information of a nearest neighbor block when the current block is included in a frequency band equal to or higher than the threshold frequency,

and the block information is the index information of the current block and the nearest neighbor block information is the index information of the nearest neighbor block, which are searched for in the time-frequency band table.

47. (new): The method of claim 46, wherein in step (b) a search scope of the nearest neighbor block includes blocks previous to the current block being currently encoded, and

the blocks previous to the current block include previous blocks of lower frequency bands in a current frame which the current block is located and blocks of a predetermined number of previous frames.

48. (new): The method of claim 47, wherein in step (b) determination of the nearest neighbor block is based on the Euclidian distance between the current block and an object block, and

the nearest neighbor block is the object block which has a least Euclidian distance among blocks previous to the current block, including previous blocks of lower frequency bands in a current frame which the current block is located and blocks of a predetermined number of previous frames.

49. (new): The method of claim 1, wherein each frequency block includes a plurality of spectrum coefficients.

50. (new): The method of claim 1, wherein the plurality of frequency blocks are arranged in a grid to form the time-frequency band table.

51. (new): The method of claim 1, wherein the current block is one of the plurality of frequency blocks being currently encoded and varies as a different block of the plurality of frequency blocks is selected to be encoded, and the index information of the corresponding frequency block varies according to the location of the corresponding frequency block in relation to the location and the index information of the current block.